INTRODUCTION

Principles & Techniques of Electrofishing

Tab 1

About the Manual

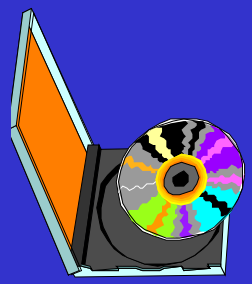
(Page 1-1, 2)

- **13 Chapters (Tabs 1 – 13)**
- **Set of appendices (Tab 14)**
- **Numbering: “Chapter # - Page #”**
- **Chapter 2 has two versions (teaching and unabridged)**
- **Quizzes at end of each chapter (answers in Appendix C)**

About the Manual

(Page 1-1, 2)

- **Structure (2 columns, key words in left side)**
- **Activities**
- **Thought questions**
- **Symbols & formulas (Appendix A)**
- **Work problems (answers in Appendix B)**



Computer-Based-Training

(Page 1-2)

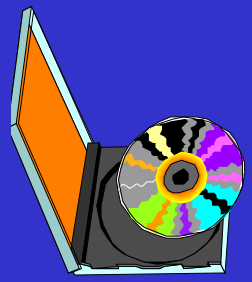
Two modules:

1) **Electric Circuit Principles**

2) **Electric Field Principles**

Installation instructions in Appendix E
“CBT Fix Windows Problem.doc” in resource CD

Resource CD



Contains directories of electrofishing topics
(theory, standardization, efficiency, fish trauma, safety)

- Articles (.pdf)
- Class powerpoints
- Excel program "*Electrofishing with Power*"

About the Manual

(Page 1-3)

- **Course evaluations (inserted in back cover)**
- **Glossary in Appendix G**
- **Contact for Questions**

Session Objectives

(Page 1-4)

- Provide an overview of the course topics
- Discuss elements of a framework for progress in EF
- Identify basic EF references

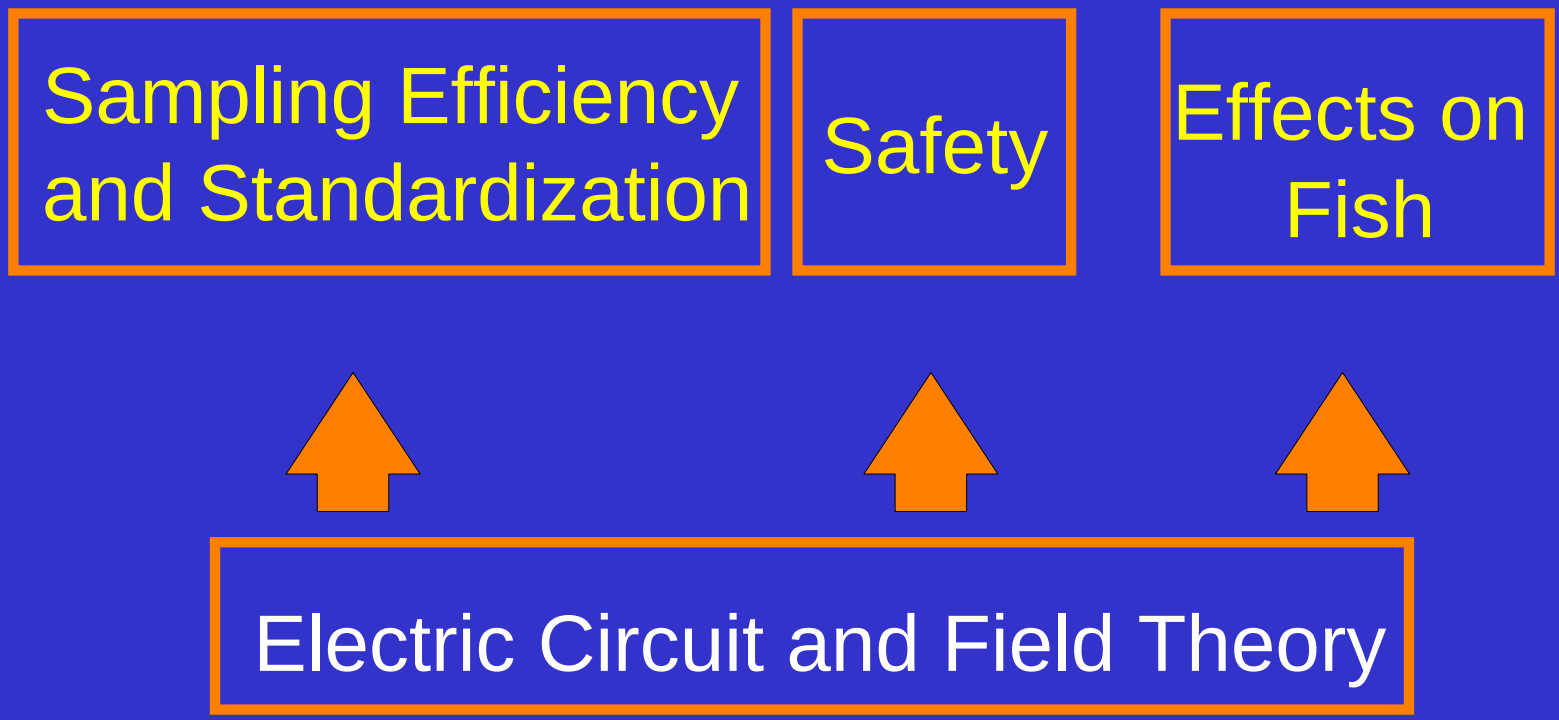
A. Purpose of Course

(Page 1-4)

This course illustrates the basic principles of electricity as applied to electrofishing

Course Summary

(Page 1-5)



B. Definition and History

(Page 1-6)

1. Electrofishing: the use of electricity to capture or control fish

2. "History of electric fishing is a classic case of almost pure muddle" (W.G. Hartley)

Many conclusions appear contradictory

Electrofishing developed independently (technique driven, not theory driven)

B. Definition and History

(Page 1-6)

3. Unification of theory and technique should continue to be addressed

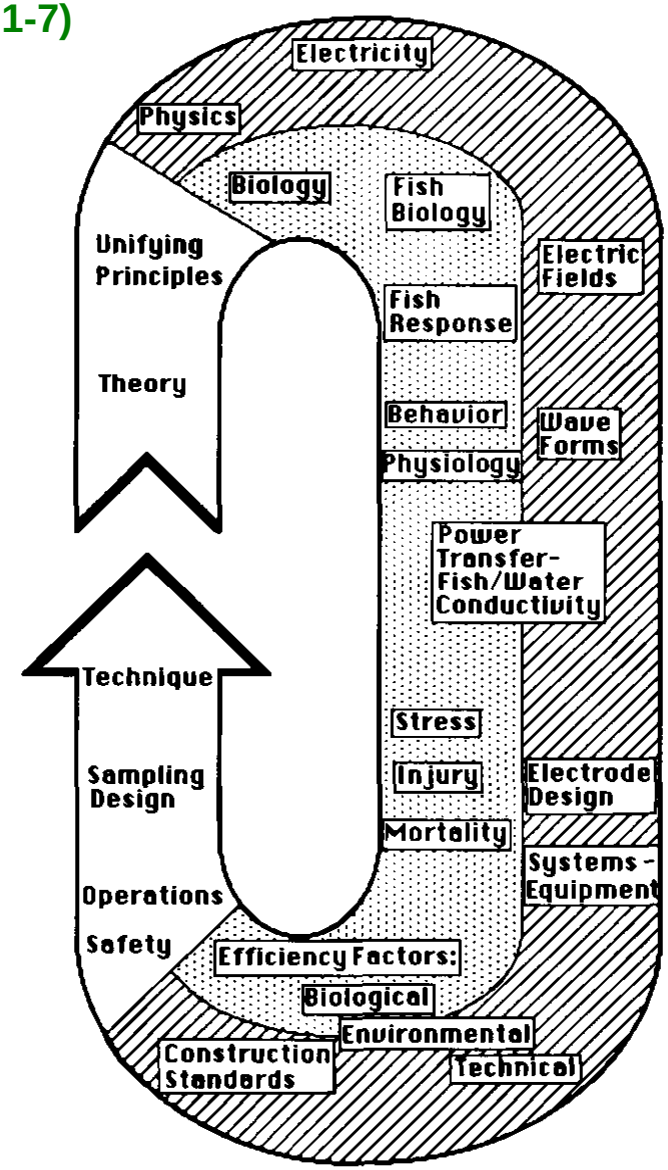
Need to develop a set of underlying principles to *support* electrofishing technique (as in power standardization)

Two major categories comprising underlying principles: biology and physics

The ***Power Transfer Theory of Electrofishing*** bridges these two categories

Framework for Progress in Electrofishing

(Page 1-7)



B. Definition and History

(Pages 1-8)

4. Developments in electricity followed closely by applications to fishing

1863: patent for electric fishing awarded
late 1800's: lab experiments on fish reactions (galvanotaxis identified)
1918: patent for use in fish screens
1930's: development of portable electrofishing gear
1931: TAFS article on using electric seine for gar and carp control

B. Definition and History

(Page 1-8)

4. Developments ... (continued)

1940's: Advances by ex-soldiers with knowledge of portable generators and associated electrical accessories; portable units improved
1949: article on fish injury caused by electrofishing
1950: JWM article on the first "boat shocker"
1950's: rapid developments in construction and use of backpack and boat electrofishers; pulsed direct current waveform developed
1960's: rigorous studies of fish behavior and physiology in electric fields (Vibert et al. in France)

B. Definition and History

(Page 1-9)

4. Developments... (continued)

1966: Symposium on Electric Fishing (Belgrade); text- Vibert. 1967. Fishing with electricity
1970's: continued refinement of equipment and techniques
1974: monograph on electrofishing boats published (Novotny and Priegel)
1980's: emphasis on quantitative sampling and safety; specialized applications (as PPAS, e-seines) used more in field
1988: International Symposium on Fishing with Electricity (Hull, England); 2 books result

B. Definition and History

(Page 1-9)

Developments... (conclusion)

late 1980's: Kolz and Reynolds develop *power transfer theory of electrofishing*; experimentation and field work has provided empirical support

early 1990's: increasing concern for operator safety and fish injury/stress;

Jim Reynolds fish injury website http://www2.sfos.uaf.edu:8080/shockingnews/

B. Definition and History

(Page 1-9)

Developments... (conclusion)

Late 1990's to present:

Testing of power transfer theory and related concepts in lab & field, standardization, catchability estimation, fish injury, invertebrate trauma, applications to sampling aquatic insects, safety

***My opinion*: expend more effort to estimating catchability and adjusting CPUE to derive population abundance estimates (more research and practice)**

C. Basic References

(Page 1-10)

1. The *Principles & Techniques of Electrofishing* (FIS2101) manual probably best comprehensive text that exists
2. Much information in journals (as North American J. of Fisheries Mgt)
3. Basic references

Cowx (1990), *Developments in electric fishing*
Cowx and Lamarque (1990), *Fishing with electricity: applications in freshwater fisheries management*

comprehensive update of Vibert (1967) with additional topics as*safety* and power transfer theory

C. Basic References
(Page 1-10)

3. Basic References (continued)

Kolz and Reynolds (1989), ***Electrofishing, a power related phenomenon***

discussion of power transfer theory of electrofishing with empirical evidence

Kolz (1993), ***In-water electrical measurements for evaluating electrofishing systems***

discussion of field measurements for determining power requirements of electrofishing equipment

C. Basic References
(Page 1-10)

3. Basic References (continued)

Burkhardt and Gutreuter (1995), ***Improving electrofishing catch consistency by standardizing power***

field evidence supporting power transfer theory; significant improvement in sampling consistency

Reynolds (1996), ***Electrofishing***, in 2nd edition AFS ***Fisheries Techniques***

substantial improvement on 1st edition chapter

C. Selected Recent References

On resource CD with some copies in Tab 15

A new resource for the electrofishing community

- www.electrofishing.net

- “At electrofishing.net, we provide those interested in electrofishing - scientists, managers, community groups and industry - with a forum for the discussion of all things electrofishing. Over the coming months, content such as articles, gear reviews and other resources (including legislation and codes of practice) will be added to the site.”